Determinant factors of pneumonia among toddlers in Makassar city

Melati Putri Dita*, Andi Sitti Rahma, Dewi Setiawati, Darmawansyih

Fakultas Kedokteran dan Ilmu Kesehatan, Universitas Islam Negeri Alauddin Makassar
Corresponding author: *E-mail: melatiputridita18@gmail.com

Abstract

Background: Indonesia ranks eighth as a country with cases of childhood pneumonia and ranks second in Indonesia as a cause of death after diarrhea. Based on data from the Makassar City Health Service, the number of pneumonia cases in toddlers in the Bara Baraya Community Health Center area is included in the top three highest pneumonia cases among all community health centers in Makassar city.
Purpose: To determine the relationship between risk factors for pneumonia in toddlers at the Bara Baraya Community Health Center.
Method: This research is analytical research with a case control approach through sampling using a total sampling technique with 68 samples, consisting of control samples and case samples obtained from medical records and interviews.
Results: In this study, the variable relationship between history of exclusive breastfeeding and pneumonia with a value of 0.000 (p-value <0.05), relationship between history of exposure to cigarette smoke and pneumonia with p-value 0.049 (p-value <0.05), relationship nutritional status with pneumonia with a p-value of 0.000 (p-value <0.05), the relationship between LBW history and pneumonia with a p-value of 0.314 (p-value >0.05), and the relationship between basic vaccinations and pneumonia with a value p-value 0.076 (p-value >0.05).
Conclusion: In this study there are several relationships with the incidence of pneumonia in toddlers, such as exclusive breastfeeding, history of exposure to cigarette smoke, and nutritional status.

Keywords: Basic Vaccinations; Exclusive Breastfeeding; Exposure to Cigarette Smoke; LBW; Nutritional Status.

INTRODUCTION

Pneumonia is an acute inflammation of lung tissue caused by microorganisms (bacteria, fungi and viruses). Pneumonia can cause mild to severe symptoms. Pneumonia is also known as wet lung. In this condition, the infection causes inflammation of the air sacs (alveoli) in one or both lungs. As a result, the alveoli are filled with fluid or pus, making it difficult for sufferers breathing (Ministry of Health of the Republic of Indonesia, 2022).

Pneumonia is an acute respiratory infection which is the main cause of death in children under five in the world, especially in developing countries. Pneumonia that occurs in toddlers will give a worse clinical picture than in adults because in toddlers the body's defense system is relatively low. Nowadays, people don't really care about pneumonia because pneumonia has symptoms that are almost the same as coughs, this happens because of the lack of public knowledge about pneumonia (Josefa, Sovia, & Mandala, 2019; Aftab, Shipton, Rabbani, Sangrasi, Perveen, Zahidie, & Qazi, 2018; McAllister, Liu, Shi, Chu, Reed, Burrows, & Nair, 2019).

In 2015 there was an increase in pneumonia to 63.45%, figures deaths due to pneumonia in toddlers were 0.16% higher compared to 2014 of 0.08%. Pneumonia is the cause of 16% of under-five deaths,

which is estimated at 920,136 under-fives in 2015. There are 10 diseases. The most pneumonia in toddlers according to provenance in Indonesia in 2016 was Nusa Southeast West 6.38%, Kab. Bangka Belitung 6.05%, South Kalimantan 5.53%, Central Sulawesi 5.19%, West Sulawesi 4.88%, Gorontalo 4.84%, West Java 4.62%, East Java 4.45%, Central Kalimantan 4.32%, and IN Yogyakarta 4.32% (Ardila, Noraida, & Erminawati, 2019).

Low Birth Weight Baby (LBW) is a term used to describe babies born with a body weight of less than 2,500 grams. Babies with low birth weight will appear smaller, thinner, and having a disproportionate head size or appearing larger than other babies. This condition is frequent occurs in babies born prematurely (before 37 weeks of gestation) or experiencing disorders fetal development (IUGR). A baby with a low birth weight may remain healthy even though it looks overweight small. However, LBW babies can also experience serious health problems (Dewi, & Sartika, 2022; Halli, Biradar, & Prasad, 2022).

Exclusive breast milk (ASI) is breast milk given to babies from birth for six months, without adding and/or replacing it with other foods or drinks (except medicine, vitamins, and mineral). The benefits of giving breast milk to babies are ideal nutrition, rich in antibodies to increase energy body resistance, helps the mother's inner bond with the baby, increases the child's intelligence, the baby's ideal weight, and can prevent sudden infant death syndrome (SIDS). Breastfeeding is thought to also reduce it risk of diabetes, obesity and certain cancers (Wijaya, 2019).

Vaccinations is an important component to reduce the death rate of children under five years of age. The importance of complete basic vaccinations is to prevent disability and death in infants/toddlers. Coverage Basic vaccinations at the Community Health Center is still below the standard, namely <90% (Iswanti, & Tansah, 2019).

Humans have many kinds of habits, exercise, reading, writing, and many others, but there is one habit that is the worst and very detrimental to humans themselves, one of which is detrimental to their health and that of others, but this bad habit is still carried out by humans. This is the smoking habit. Cigarettes are processed, wrapped tobacco products produced from the Nicotiana Tabacum, Nicotiana

Rustica and other species or synthetic species containing nicotine and tar with or without additional ingredients (Hidayati, Pujiana, & Fadillah, 2020; Kishore, 2014).

The problem of malnutrition is still a national and even global health issue. Malnutrition is the highest cause of child death in developing countries. Malnutrition (bad nutrition) is a state of severe energy and protein deficiency due to an imbalance between food intake and nutritional needs. Chronic nutritional deficiencies are a high risk factor for malnutrition which is characterized by malabsorption or metabolic failure (Alpin, 2021).

Of the 12 variables studied, there were 6 variables that were at risk for the incidence of pneumonia in toddlers, namely ventilation, lighting, temperature, humidity, smoking habits, history of breastfeeding, the most variable The risk of pneumonia in toddlers is lighting. This research can be concluded house floor, proportion of ventilation, intensity of natural lighting (sunlight), temperature, humidity, density residence, smoking habits at home, history of family members suffering from respiratory tract infections, fuel for cooking, nutritional status, vaccinations status and history of breastfeeding, have association with the incidence of pneumonia (Indah, Suryani, & Rosalina, 2022).

Pneumonia killed 740,180 children under 5 years of age in 2019, accounting for 14% of all deaths in children under 5 years of age but 22% of all deaths in children aged 1 to 5 years. Pneumonia attacks children and families everywhere, but the highest deaths occur in South Asia and Sub-Saharan Africa (World Health Organization, 2022).

Based on the 2016 Indonesian Health Profile, the number of pneumonia cases among children under five in South Sulawesi Province was 3,824 people or 18.58%. Based on data from the Makassar City Health Service, the number of pneumonia cases in toddlers in the Bara Baraya Health Center area is included in the top three highest pneumonia cases among all health centers in Makassar city.

RESEARCH METHOD

The type of research used is analytical observational with a case and control research design. This research began by identifying risk factors that occurred in the case group and control group. This research is a retrospective study with a

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Fakultas Kedokteran dan Ilmu Kesehatan, Universitas Islam Negeri Alauddin Makassar
Corresponding author: *E-mail: melatiputridita18@gmail.com

case control approach, namely comparing a group of toddlers who were sick >2x in 1 year (pneumonia cases) with a group who were sick <2x in 1 year (controls who were not sick with pneumonia). Then we look for the cause of the disease, where this research measures the independent variable and the dependent variable at the same time and in this study we can find out the risk factors for the incidence of pneumonia in toddlers at the Bara-Baraya Community Health Center which was recorded in 2019 with a total of 30 people. This research has been approved by the ethics commission of Alauddin Makassar State Islamic University with number E.30/KEPK/FKIK/II/2020.

The sample of research cases was all toddlers with a history of pneumonia >2x, with a total of 30 people obtained through medical records to obtain data on children diagnosed with pneumonia and their nutritional status. Meanwhile, the control sample was toddlers who suffered from pneumonia or had a history of pneumonia <2x with a total of 38 people obtained through interviews using a questionnaire to obtain data on the nutritional status of toddlers, exclusive breastfeeding, history of LBW, exposure to cigarette smoke, and complete basic vaccinations.

Demographic data that will be recorded from the subject will be birth weight, exclusive breastfeeding status, status vaccinations, exposure to cigarette smoke, and nutritional status. The data source in this research is secondary data originating from the patient's medical record. Consent to the study and use of medical records was approved by head of the Bara Baraya Community Health Center. The existing data is then processed and analyzed statistically Product and Service Solution (SPSS). Univariate analysis aims to describe the characteristics of respondents in research. Bivariate analysis was carried out by carrying out cross tabulations to look for relationships between each variable. The results of bivariate analysis are used to select variables to be included into analysis. The sampling method used in this research is technique *total sampling* while data analysis is univariate and bivariate analysis using tests*chi-square*.

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Fakultas Kedokteran dan Ilmu Kesehatan, Universitas Islam Negeri Alauddin Makassar
Corresponding author: *E-mail: melatiputridita18@gmail.com

RESULTS

Table 2. Variables that Correlate with Pneumonia Occurrence (N=68)

Variable	Pneumonia		p-value
	Control (n=38)	Case (n=30)	
Toddler Age (Mean±SD)(Range)(Months)	(22.41±11.893)(12-48)	(20.41±10.671)(12-48)	
Gender (n/%)			
Male	20/52.6	18/60	
Female	18/47.4	12/40	
Birth Weight (n/%)			
Low	5/13.2	10/33.3	**0.002**
Normal	33/86.8	20/66.7	
Exclusive Breastfeeding(n/%)			
< 6 month	8/21.1	19/63.3	0.231
≥ 6 month	30/78.9	11/36.7	
Basic Vaccinations (n/%)			
Incomplete	5/13.2	0/0	0.334
Complete	33/86.8	30/100	
Exposure to Cigarette Smoke (n/%)			
Sometimes	20/52.6	0/0	0.435
Always	18/47.4	30/100	
Nutritional Status (n/%)			
Poor	4/10.5	17/56.7	**0.000**
Good	34/89.5	13/43.3	

Based on Table 1, it is known that the age of toddlers in the control group with a mean and standard deviation of (22.41 ± 11,893) and in cases (20.41 ± 10,671) with the same age range, namely between 12-48 months, the majority were male, 52.6%. control group and 60% in the case group.

From a total of 68 samples, it was found that normal birth weight in toddlers with a history of pneumonia was higher than in toddlers without a history of pneumonia. Based on the Chi-square test, a p-value of 0.002 was obtained, meaning that there was a significant difference between the birth weight history of toddlers with pneumonia and toddlers without pneumonia, so it could be concluded that there was a relationship between birth weight and the incidence of pneumonia.

From a total of 68 samples, it was found that exclusive breastfeeding was higher in toddlers with a history of pneumonia <2x compared to toddlers with a history of pneumonia >2x. Based on the Chi-square test, the p-value was obtained at 0.231, meaning that in terms of exclusive breastfeeding there is no significant difference between toddlers who have a history of pneumonia and toddlers who do not have a history of pneumonia, so it can be concluded that there is no relationship between exclusive breastfeeding and the incidence of pneumonia. pneumonia.

From a total of 68 samples, it was found that basic vaccination for toddlers with a history of pneumonia was >2x higher than for toddlers with a history of pneumonia <2x. Based on the Chi-square test, a p-value of 0.334 was obtained, meaning there was no significant difference between the history of basic vaccination in toddlers

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Fakultas Kedokteran dan Ilmu Kesehatan, Universitas Islam Negeri Alauddin Makassar
Corresponding author: *E-mail: melatiputridita18@gmail.com

suffering from pneumonia and toddlers who did not suffer from pneumonia, so it can be concluded that there is no relationship between basic vaccination and the incidence of pneumonia.

From a total of 68 samples, it was found that exposure to cigarette smoke in toddlers with a history of pneumonia was >2x higher than in toddlers with a history of pneumonia <2x. Based on the Chi-square test, a p-value was obtained of 0.435, which means that in exposure to cigarette smoke there is no significant difference between toddlers who have a history of pneumonia and toddlers who do not have a history of pneumonia, so it can be concluded that there is no relationship between exposure to cigarette smoke and the incidence of pneumonia.

From a total of 68 samples, it was found that the good nutritional status of toddlers with a history of pneumonia <2x was higher than toddlers with a history of pneumonia >2x. Based on the Chi-square test, a p-value of 0.000 was obtained, meaning that in terms of nutritional status there is a significant difference between toddlers who have a history of pneumonia and toddlers who do not have a history of pneumonia, so it can be concluded that there is a relationship between nutritional status and the incidence of pneumonia.

DISCUSSION

There is no significant relationship between LBW and the incidence of pneumonia in toddlers. Based on research, toddlers with a history of low birth weight have a high risk of experiencing pneumonia infection because in toddlers with LBW the immune system formation is less than perfect. However, the incidence of pneumonia is caused by several factors such as exclusive breastfeeding, nutritional status, vaccinations and environmental conditions of toddlers. Apart from that, the handling and care of babies with LBW has improved so that it can reduce the number of morbidity and deaths due to LBW (Yulia, & Efni, 2015).

Pneumonia is an acute respiratory-related inflammatory condition affecting the lungs, caused by infectious agents, including viruses, bacteria and fungi. In general, the most common is Streptococcus pneumoniae, the most common cause in children. Haemophilus influenza type B is generally the second most common cause of pneumonia in children. Pneumonia is the biggest cause of death in children throughout the world. Pneumonia killed 920,136 children under 5 years of age in 2015, accounting for 16% of all deaths in children under 5 years of age, most prevalent in South Asia and Sub-Saharan Africa (Setiani, 2019).

Low Birth Weight or LBW babies are newborn babies with a body weight of less than 2500 grams regardless of gestation period, the prevalence of low birth weight babies in the world is 15%. Where in Sub Saharan Africa 13%, Eastern and Southern Africa 11%, Western and Central Africa 14%, South Asia 28%, East Asia and the Pacific 6%, Latin America and the Caribbean 9%, and developing countries 13% (Sembiring, Pratiwi, & Sarumaha, 2019).

Respondents who exclusively breastfed (214 respondents or 71.3%), most of whom had ARI frequency in the rare category, namely 108 respondents (36%). Breast milk (ASI) is milk produced by humans for consumption by babies and is the main source of nutrition for babies who cannot yet digest solid food. Breast milk contains protein, fat, sugar and calcium at the right levels. Apart from that, breast milk also contains sufficient essential nutrients for babies even if the mother is malnourished (Mika, 2020).

High or low basic vaccinations status is caused by several factors. Rumors in the community about vaccinations, knowledge and motivation of parents to get their children vaccinations, the role of health workers in distributing information, as well as promotional and other efforts have an influence on the completeness of the basic vaccinations status of toddlers. However, there is no relationship between complete basic vaccinations with the incidence of pneumonia in toddlers at Zainoel Abidin Hospital, Banda Aceh City (Andayani, Ismy, Bakhtiar, & Salawati, 2020).

Vaccinations is an investment in future health because it prevents disease through vaccinations The most effective protection against infection and much cheaper than treating someone if or get sick and have to be treated in hospital (Dompas, 2014).

Based on the development program of the Indonesian Pediatrician Association. Mandatory Vaccinations Development Program and recommended non vaccinations Program. Mandatory

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Fakultas Kedokteran dan Ilmu Kesehatan, Universitas Islam Negeri Alauddin Makassar
Corresponding author: *E-mail: melatiputridita18@gmail.com

if the incidence of the disease is high enough to cause disability or death. Meanwhile, vaccinations is recommended for special diseases which are usually not as serious as the first group (Ningrum, & Sulastri, 2008).

Pneumonia coverage in Indonesia in 2010-2014 ranged between 20-30% and since 2015-2019 it has increased. The increasing incidence of pneumonia in toddlers can be caused by various factors, including parental behavior, smoking habits by family members, and the environment around toddlers (Anjaswanti, Azizah, & Leonita, 2022).

There is a significant relationship between smoking behavior at home and the incidence of pneumonia in toddlers. This is in line with previous research where there was a relationship between smoking behavior at home and the incidence of pneumonia in toddlers. Children often become passive smokers due to the behavior of parents who smoke at home (Yunus, Ekawati, & Savitri, 2020).

Parents' smoking habits at home make toddlers passive smokers who are always exposed to cigarette smoke. Households where parents have a smoking habit have the opportunity to increase the incidence of ISPA (Wahyudi, Zainaro, & Kurniawan, 2021).

The highest incidence of pneumonia was in toddlers who had poor nutritional status, namely 14 people with presentation is 100% then toddlers with moderate nutritional status are 12 with a presentation of 70.4% and incidence pneumonia was lowest in toddlers with good nutritional status, namely 5 people with a percentage of 14.7%. From the results Chi square test obtained a p value of 0.000 or $P<0.05$, which means there is a relationship between nutritional status and the incidence of pneumonia in toddlers at Lewoleba Regional Hospital (Leonardus, & Anggraeni, 2019).

There is a significant relationship between nutritional status and the degree of pneumonia in children under five in hospitals. Dr. M. Djamil. A significant relationship between nutritional status and pneumonia classification was also found in research. This decrease in immunity is caused by a decrease in the activity of leukocytes to phagocyte and kill germs (Nurnajiah, Rusdi, & Desmawati, 2016).

Toddlers who have poor nutritional status are 5.342 times more likely to experience pneumonia compared to toddlers who have good nutritional status. Providing nutrition that is appropriate to the growth and development of toddlers can prevent toddlers from various infectious diseases so that the child's growth and development is optimal. Nutritional status places toddlers at increased risk of pneumonia in two ways. First, malnutrition, both micronutrients and macronutrients, can weaken a toddler's immune system. Second, lack of nutrition in toddlers can also weaken respiratory muscles which can inhibits the respiratory system in toddlers. There is a relationship between nutritional status and the incidence of pneumonia in toddlers (Kusparlina, & Wasito, 2022).

CONCLUSION

The incidence of pneumonia at the Bara-Baraya Community Health Center was related to LBW and nutritional status and was not related to exclusive breastfeeding, exposure to cigarette smoke, and basic vaccinations.

SUGGESTION

The suggestions that can be given include the hope that the community, especially mothers with toddlers, can understand that pneumonia is a dangerous infectious disease that is often found in toddlers and that one of the factors causing pneumonia is nutritional status for toddlers.

Parents who have toddlers are expected to take precautions against pneumonia infections, such as paying attention to children's nutrition, environmental conditions and completeness of basic vaccinations.

For community health centers, to further improve services in the field of counseling and education to parents and families regarding the dangers of respiratory tract infections and factors that increase the risk of pneumonia in toddlers.

The researcher also wants to convey that based on the results of the study, it was found that there was no relationship between complete basic vaccinations and LBW with the incidence of pneumonia. However, the results obtained from research by other researchers showed that vaccinations and LBW were related to the incidence of pneumonia. This shows that vaccinations and LBW is not the only factor causing pneumonia in children. Therefore, it is hoped that in this research, readers will be able to understand and find out what factors can increase the risk of pneumonia and the

Melati Putri Dita*, Andi Sitti Rahma, Dewi Setiawati, Darmawansyih

Fakultas Kedokteran dan Ilmu Kesehatan, Universitas Islam Negeri Alauddin Makassar
Corresponding author: *E-mail: melatiputridita18@gmail.com

importance of maintaining family health.

The weakness of this research is the opportunity for this to occur bias quite large, this is because in this study respondents had to recall the history of basic vaccinations that had been given to their children and for nutritional status, respondents also had to recall their child's last weight and height. This can be a reference for further research regarding the need for researchers to directly look at the child's vaccinations history and nutritional status in the KIA book, examination results data or the child's growth and development monitoring book.

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Fakultas Kedokteran dan Ilmu Kesehatan, Universitas Islam Negeri Alauddin Makassar
Corresponding author: *E-mail: melatiputridita18@gmail.com

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Fakultas Kedokteran dan Ilmu Kesehatan, Universitas Islam Negeri Alauddin Makassar
Corresponding author: *E-mail: melatiputridita18@gmail.com